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10. A medical device comprising a flexible composite component comprising an inorganic substrate

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and a polymer member covering at least over a portion of the substrate, wherein the composite can be bent, at least, about 100 degrees without extending the material beyond its elastic limit.

11. The medical device of claim 10 wherein the inorganic substrate comprises a metal foil with a thickness less than about 500 microns.

12. The medical device of claim 10 wherein the polymer is selected from the group consisting of polyurethanes, polydimethylsiloxanes and polytetrafluoro ethylenes.

13. The medical device of claim 10 wherein the polymer member has a thickness from about 10 microns to about 500 microns.

14. The medical device of claim 10 wherein the polymer member has a thickness from about 50 microns to about 300 microns.

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~~15 The medical device of claim 10 wherein the
medical device comprises a heart valve prosthesis and
the composite component comprising leaflets.~~

Subject

16. The medical device of claim 10 wherein the composite can be bent about 180 degrees without extending the material beyond its elastic limit.

~~17. The medical device of claim 10 wherein the composite can be bent about 180 degrees with a radius of curvature about the thickness of the composite without extending the material beyond its elastic limit.~~

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18. The medical device of claim 10 wherein the composite can be bent about 60 degrees for about 40 million cycles without significant structural failure.

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19. The medical device of claim 10 wherein the composite can be bent about 60 degrees for about 400 million cycles without significant structural failure.

→ 20. The medical device of claim 10 wherein the composite further comprises a diamond-like carbon coating over at least a portion of the polymer.

21. A method of forming a medical device, the method comprising applying a polymer on an inorganic substrate to form a composite, wherein the polymer is applied such that the polymer does not conform to the shape of the substrate.

22. The method of claim 21 wherein the process for the application of the polymer comprises a molding process.

23. The method of claim 21 wherein the process for the application of the polymer comprises an injection molding process.

24. The method of claim 21 wherein the process for the application of the polymer comprises a casting process.

25. The method of claim 21 wherein the process for the application of the polymer comprises an extrusion process.

26. The method of claim 21 wherein the composite can be bent at least about 100 degrees.

27. The method of claim 21 further comprising crosslinking the polymer.

28. The method of claim 21 further comprising applying a diamond-like carbon coating onto the substrate.

29. The method of claim 21 wherein the medical device comprises a heart valve prosthesis.

30. The method of claim 21 wherein the polymer has a thickness greater than about 10 microns.

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